

What is claimed is:

1. A wafer processing system that executes processing for a wafer having a front surface on which a device is formed in each of a plurality of regions partitioned by a plurality of planned dividing lines that intersect, the wafer processing system comprising:

a laser processing apparatus including a laser beam irradiation unit with a laser oscillator that generates a laser beam and irradiates the wafer with the laser beam to form modified layers inside the wafer along the planned dividing lines;

a grinding apparatus including a grinding unit that grinds a back surface of the wafer to thin the wafer;

a tape sticking apparatus including frame-unit forming means for sticking a dicing tape to the back surface of the wafer ground by the grinding apparatus and fixing an annular frame to an outer circumferential edge of the dicing tape and separating means for separating a protective tape stuck to the front surface of the wafer;

a first cassette placement part at which a first cassette that houses a plurality of wafers each having the front surface to which the protective tape is stuck is placed;

a second cassette placement part at which a second cassette that houses a plurality of wafers each supported in an opening of the annular frame by the dicing tape is placed;

a conveying unit that conveys the wafer among the laser processing apparatus, the grinding apparatus, the tape sticking apparatus, the first cassette, and the second cassette; and

control means for controlling the laser processing apparatus, the grinding apparatus, the tape sticking apparatus, and the conveying unit,

wherein the control means includes:

a first processing program instructing section configured to output a control signal for conveying the wafer unloaded from the first cassette to the laser processing apparatus, the grinding apparatus, the tape sticking apparatus, and the second cassette and sequentially carrying out processing by the laser processing apparatus, the grinding apparatus, the tape sticking apparatus and the second cassette on the wafer, and

a second processing program instructing section configured to output a control signal for conveying the wafer unloaded from the first cassette to the grinding apparatus, the laser processing apparatus, the tape

sticking apparatus, and the second cassette and sequentially carrying out processing by the grinding apparatus, the laser processing apparatus, the tape sticking apparatus and the second cassette on the wafer.

2. The wafer processing system according to claim 1, wherein the control means further includes;

a third processing program instructing section configured to output a control signal for conveying the wafer unloaded from the first cassette to the grinding apparatus and the tape sticking apparatus and carrying out processing by the grinding apparatus and the tape sticking apparatus on the wafer, and

a fourth processing program instructing section configured to output a control signal for conveying the wafer unloaded from the first cassette or the second cassette, to the laser processing apparatus and carrying out processing by the laser processing apparatus for the wafer,

wherein the third processing program and the fourth processing program are concurrently executed.

3. The wafer processing system according to claim 1, wherein the wafer conveying unit includes a first conveying apparatus having an arm that holds the wafer and conveys the wafer between a provisional placement part and a position adjustment unit in the grinding apparatus.

4. The wafer processing system according to claim 3, wherein the wafer conveying unit includes a second conveying apparatus having an arm that holds the wafer and conveys the wafer to a cleaning unit.

5. The wafer processing system according to claim 1, wherein the first processing program instructing section includes a modified-layer forming step in which the laser processing apparatus forms a modified layer inside the wafer with the laser beam.

6. The wafer processing system according to claim 1, wherein the second processing program instructing section includes a modified-layer forming step in which the laser processing apparatus forms a modified layer inside the wafer with the laser beam.

7. The wafer processing system according to claim 2, wherein the fourth processing program instructing section includes a modified-layer forming step in which the laser processing apparatus forms a modified layer inside the wafer with the laser beam.